



SEQUENCE LISTING

<110> CO, MAN SUNG
VASQUEZ, MAXIMILIANO
CARRENO, BEATRIZ
CELNIKER, ABBIE CHERYL
COLLINS, MARY
GOLDMAN, SAMUEL
GRAY, GARY S.
KNIGHT, ANDREA
O'HARA, DENISE
RUP, BONITA
VELDMAN, GEERTRUIDA M.

<120> HUMANIZED IMMUNOGLOBULIN REACTIVE WITH B7-2 AND METHODS
OF TREATMENT THEREWITH

<130> 08702.0081-00000

<140> 09/249,011

<141> 1999-02-12

<160> 24

<170> PatentIn Ver. 2.1

<210> 1

<211> 405

<212> DNA

<213> Murine sp.

<220>

<221> CDS

<222> (1)..(405)

<223> Anti-B7-2 heavy chain

<400> 1

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Met Gly Trp Asn Cys Ile Ile Phe Phe Leu Val Thr Thr Ala Thr Gly
1 5 10 15

gtg cac tcc cag gtc cag ctg cag cag tct ggg cct gag ctg gtg agg 96
Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Arg
20 25 30

cct ggg gaa tca gtg aag att tcc tgc aag ggt tcc gga tac aca ttc 144
Pro Gly Glu Ser Val Lys Ile Ser Cys Lys Gly Ser Gly Tyr Thr Phe
35 40 45

act gat tat gct ata cag tgg gtg aag cag agt cat gca aag agt cta 192
Thr Asp Tyr Ala Ile Gln Trp Val Lys Gln Ser His Ala Lys Ser Leu
50 55 60

gag tgg att gga gtt att aat att tac tat gat aat aca aac tac aac 240
Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn
65 70 75 80

cag aag ttt aag ggc aag gcc aca atg act gta gac aaa tcc tcc agc 288
 Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys Ser Ser Ser
 85 90 95

aca gcc tat atg gaa ctt gcc aga ttg aca tct gag gat tct gcc atc 336
 Thr Ala Tyr Met Glu Leu Ala Arg Leu Thr Ser Glu Asp Ser Ala Ile
 100 105 110

tat tac tgt gca aga gcg gcc tgg tat atg gac tac tgg ggt caa gga 384
 Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp Gly Gln Gly
 115 120 125

acc tca gtc acc gtc tcc tca 405
 Thr Ser Val Thr Val Ser Ser
 130 135

<210> 2
 <211> 135
 <212> PRT
 <213> Murine sp.

<220>
 <223> Anti-B7-2 heavy chain

<400> 2
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 1 5 10 15
 Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Arg
 20 25 30
 Pro Gly Glu Ser Val Lys Ile Ser Cys Lys Gly Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Ala Ile Gln Trp Val Lys Gln Ser His Ala Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys Ser Ser Ser
 85 90 95
 Thr Ala Tyr Met Glu Leu Ala Arg Leu Thr Ser Glu Asp Ser Ala Ile
 100 105 110
 Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp Gly Gln Gly
 115 120 125
 Thr Ser Val Thr Val Ser Ser
 130 135

<210> 3
 <211> 396
 <212> DNA
 <213> Murine sp.

<220>
 <221> CDS
 <222> (1) .. (396)
 <223> Anti-B7-2 light chain

<400> 3
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 Met Asp Ser Gln Ala Gln Val Leu Ile Leu Leu Leu Trp Val Ser
 1 5 10 15

ggg acc tgt ggg gac att gtg ctg tca cag tct cca tcc tcc ctg gct 96
 Gly Thr Cys Gly Asp Ile Val Leu Ser Gln Ser Pro Ser Ser Leu Ala
 20 25 30

gtg tca gca gga gag aag gtc act atg agc tgc aaa tcc agt cag agt 144
 Val Ser Ala Gly Glu Lys Val Thr Met Ser Cys Lys Ser Ser Gln Ser
 35 40 45

ctg ctc aac agt aga aac cga gag aac tac ttg gct tgg tac cag cag 192
 Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu Ala Trp Tyr Gln Gln
 50 55 60

aaa cca ggg cag tct cct aaa ctg ctg atc tac tgg gca tcc act agg 240
 Lys Pro Gly Gln Ser Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
 65 70 75 80

gaa tct ggg gtc cct gat cgc ttc aca ggc agt gga tct ggg aca gat 288
 Glu Ser Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp
 85 90 95

ttc act ctc acc atc agc agt gtg cag gct gaa gac ctg gca gtt tat 336
 Phe Thr Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Leu Ala Val Tyr
 100 105 110

tac tgc acg caa tct tat aat ctt tac acg ttc gga ggg ggg acc aag 384
 Tyr Cys Thr Gln Ser Tyr Asn Leu Tyr Thr Phe Gly Gly Gly Thr Lys
 115 120 125

ctg gaa ata aaa 396
 Leu Glu Ile Lys
 130

<210> 4
 <211> 132
 <212> PRT
 <213> Murine sp.

<220>
 <223> Anti-B7-2 light chain

<400> 4
 Met Asp Ser Gln Ala Gln Val Leu Ile Leu Leu Leu Trp Val Ser
 1 5 10 15

Gly Thr Cys Gly Asp Ile Val Leu Ser Gln Ser Pro Ser Ser Leu Ala
 20 25 30

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<210> 5
<211> 405
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Humanized
murine anti-human B7-2 heavy chain
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51

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| <400> | 5 | | | | | | | | | | | | | | | |
| atg ggt tgg aac tgt atc atc ttc ttt ctg gtt acc aca gct aca ggt | | | | | | | | | | | | | | | | 48 |
| Met Gly Trp Asn Cys Ile Ile Phe Phe Leu Val Thr Thr Ala Thr Gly | | | | | | | | | | | | | | | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| | | | | | | | | | | | | | | | | |
| gtg cac tcc cag gtc cag ctg gtg cag tct ggg gct gag gtg aag aag | | | | | | | | | | | | | | | | 96 |
| Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys | | | | | | | | | | | | | | | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| | | | | | | | | | | | | | | | | |
| cct ggg agc tca gtg aag gtg tcc tgc aaa gct tcc ggc tac aca ttc | | | | | | | | | | | | | | | | 144 |
| Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe | | | | | | | | | | | | | | | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| | | | | | | | | | | | | | | | | |
| act gat tat gct ata cag tgg gtg aga cag gct cct gga cag ggc ctc | | | | | | | | | | | | | | | | 192 |
| Thr Asp Tyr Ala Ile Gln Trp Val Arg Gln Ala Pro Gly Gln Gly Leu | | | | | | | | | | | | | | | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| | | | | | | | | | | | | | | | | |
| gag tgg att gga gtt att aat att tac tat gat aat aca aac tac aac | | | | | | | | | | | | | | | | 240 |
| Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn | | | | | | | | | | | | | | | | |
| 65 | | | | | 70 | | | | 75 | | | | | 80 | | |

cag aag ttt aag ggc aag gcc aca atg act gta gac aag tcg acg agc 288
 Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys Ser Thr Ser
 85 90 95

aca gcc tat atg gaa ctt agt tct ttg aga tct gag gat acg gcc gtt 336
 Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
 100 105 110

tat tac tgt gca aga gcg gcc tgg tat atg gac tac tgg ggt caa ggt 384
 Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp Gly Gln Gly
 115 120 125

acc ctt gtc acc gtc tcc tca 405
 Thr Leu Val Thr Val Ser Ser
 130 135

<210> 6
 <211> 135
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Humanized
 murine anti-human B7-2 heavy chain

<400> 6
 Met Gly Trp Asn Cys Ile Ile Phe Phe Leu Val Thr Thr Ala Thr Gly
 1 5 10 15

Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
 20 25 30

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45

Thr Asp Tyr Ala Ile Gln Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
 50 55 60

Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn
 65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys Ser Thr Ser
 85 90 95

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
 100 105 110

Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp Gly Gln Gly
 115 120 125

Thr Leu Val Thr Val Ser Ser
 130 135

<210> 7
 <211> 396

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Humanized
murine anti-human B7-2 light chain

<220>

<221> CDS

<222> (1)..(396)

<400> 7

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  1          5          10          15

ggc acc tgt ggg gac att gtg ctg aca cag tct cca gat tcc ctg gct 96
Gly Thr Cys Gly Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala
          20          25          30

gta agc tta gga gag agg gcc act att agc tgc aaa tcc agt cag agt 144
Val Ser Leu Gly Glu Arg Ala Thr Ile Ser Cys Lys Ser Ser Gln Ser
          35          40          45

ctg ctc aac agt aga acc cga gag aac tac ttg gct tgg tac cag cag 192
Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu Ala Trp Tyr Gln Gln
          50          55          60

aaa cca ggg cag cct cct aaa ctg ctg atc tac tgg gca tcc act agg 240
Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
          65          70          75          80

gaa tct ggg gtc cct gat cgc ttc agt ggc agt gga tct ggg aca gat 288
Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
          85          90          95

ttc act ctc acc atc agc agt ctg cag gct gaa gac gtg gca gtt tat 336
Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr
          100          105          110

tac tgc acg caa tct tat aat ctt tac acg ttc gga cag ggg acc aag 384
Tyr Cys Thr Gln Ser Tyr Asn Leu Tyr Thr Phe Gly Gln Gly Thr Lys
          115          120          125

gtg gaa ata aaa 396
Val Glu Ile Lys
          130

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<210> 8

<211> 132

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Humanized
murine anti-human B7-2 light chain

<400> 8

Met Asp Ser Gln Ala Gln Val Leu Ile Leu Leu Leu Trp Val Ser
 1 5 10 15

Gly Thr Cys Gly Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala
 20 25 30

Val Ser Leu Gly Glu Arg Ala Thr Ile Ser Cys Lys Ser Ser Gln Ser
 35 40 45

Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu Ala Trp Tyr Gln Gln
 50 55 60

Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
 65 70 75 80

Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
 85 90 95

Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr
 100 105 110

Tyr Cys Thr Gln Ser Tyr Asn Leu Tyr Thr Phe Gly Gln Gly Thr Lys
 115 120 125

Val Glu Ile Lys
 130

<210> 9

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR1 of
 humanized murine anti-human B7-2 heavy chain

<220>

<221> CDS

<222> (1)..(15)

<400> 9

gat tat gct ata cag
 Asp Tyr Ala Ile Gln
 1 5

15

<210> 10

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR1 of humanized
 murine anti-human B7-2 heavy chain

<400> 10
 Asp Tyr Ala Ile Gln
 1 5

<210> 11
 <211> 51
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR2 of
 humanized murine anti-human B7-2 heavy chain

<220>
 <221> CDS
 <222> (1)..(51)

<400> 11
 gtt att aat att tac tat gat aat aca aac tac aac cag aag ttt aag 48
 Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn Gln Lys Phe Lys
 1 5 10 15

ggc 51
 Gly

<210> 12
 <211> 17
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR2 of humanized
 murine anti-human B7-2 heavy chain

<400> 12
 Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn Gln Lys Phe Lys
 1 5 10 15

Gly

<210> 13
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR3 of
 humanized murine anti-human B7-2 heavy chain

<220>
 <221> CDS
 <222> (1)..(21)

E1

<400> 13

gcg gcc tgg tat atg gac tac
Ala Ala Trp Tyr Met Asp Tyr
1 5

21

<210> 14

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR3 of humanized
murine anti-human B7-2 heavy chain

<400> 14

Ala Ala Trp Tyr Met Asp Tyr
1 5

<210> 15

<211> 51

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR1 of
humanized murine anti-human B7-2 light chain

<320>

<221> CDS

<222> (1)..(51)

<400> 15

aaa tcc agt cag agt ctg ctc aac agt aga acc cga gag aac tac ttg 48
Lys Ser Ser Gln Ser Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu
1 5 10 15

gct

Ala

51

<210> 16

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR1 of humanized
murine anti-human B7-2 light chain

<400> 16

Lys Ser Ser Gln Ser Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu
1 5 10 15

Ala

<210> 17
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR2 of
 humanized murine anti-human B7-2 light chain

<220>
 <221> CDS
 <222> (1)..(21)

<400> 17
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 Trp Ala Ser Thr Arg Glu Ser
 1 5

21

<210> 18
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR2 of humanized
 murine anti-human B7-2 light chain

<400> 18
 Trp Ala Ser Thr Arg Glu Ser
 1 5

<210> 19
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: CDR3 of
 humanized murine anti-human B7-2 light chain

<220>
 <221> CDS
 <222> (1)..(24)

<400> 19
 acg caa tct tat aat ctt tac acg
 Thr Gln Ser Tyr Asn Leu Tyr Thr
 1 5

24

<210> 20
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: CDR3 of humanized murine anti-human B7-2 light chain

<400> 20

Thr Gln Ser Tyr Asn Leu Tyr Thr

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<210> 21

<211> 1960

<212> DNA

<213> Mus sp.

<220>

<221> CDS

<222> (12)..(408)

<220>

<221> CDS

<222> (768)..(1087)

<400> 21

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Met Asp Ser Gln Ala Gln Val Leu Ile Leu Leu Leu

1

5

10

tgg gta tct ggc acc tgt ggg gac att gtg ctg aca cag tct cca gat 98

Trp Val Ser Gly Thr Cys Gly Asp Ile Val Leu Thr Gln Ser Pro Asp

15

20

25

tcc ctg gct gta agc tta gga gag agg gcc act att agc tgc aaa tcc 146

Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Ser Cys Lys Ser

30

35

40

45

agt cag agt ctg ctc aac agt aga acc cga gag aac tac ttg gct tgg 194

Ser Gln Ser Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu Ala Trp

50

55

60

tac cag cag aaa cca ggg cag cct cct aaa ctg ctg atc tac tgg gca 242

Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala

65

70

75

tcc act agg gaa tct ggg gtc cct gat cgc ttc agt ggc agt gga tct 290

Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser

80

85

90

ggg aca gat ttc act ctc acc atc agc agt ctg cag gct gaa gac gtg 338

Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val

95

100

105

gca gtt tat tac tgc agc caa tct tat aat ctt tac acg ttc gga cag 386

Ala Val Tyr Tyr Cys Ser Gln Ser Tyr Asn Leu Tyr Thr Phe Gly Gln

110

115

120

125

ggg acc aag gtg gaa ata aaa c gtaagtagtc ttctcaactc tagaaattct 438

Gly Thr Lys Val Glu Ile Lys

130

三

tcaaccaaag caaatTTTTc aaaagaagaa acctgctata aagagaatca ttcattgcaa 1667
 catgatataa aataacaaca caataaaagc aattaaataa acaaacaata gggaaatggt 1727
 taagtTcatc atgggtactta gacttaatgg aatgtcatgc cttatttaca tttttaaaca 1787
 ggtactgagg gactcctgtc tgccaagggc cgtattgagt actttccaca acctaattta 1847
 atccacacta tactgtgaga ttaaaaacat tcattaaaat gttgcaaagg ttctataaag 1907
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<210> 22
 <211> 239
 <212> PRT
 <213> Mus sp.

<400> 22
 Met Asp Ser Gln Ala Gln Val Leu Ile Leu Leu Leu Leu Trp Val Ser
 1 5 10 15
 Gly Thr Cys Gly Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala
 20 25 30
 Val Ser Leu Gly Glu Arg Ala Thr Ile Ser Cys Lys Ser Ser Gln Ser
 35 40 45
 Leu Leu Asn Ser Arg Thr Arg Glu Asn Tyr Leu Ala Trp Tyr Gln Gln
 50 55 60
 Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
 65 70 75 80
 Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
 85 90 95
 Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr
 100 105 110
 Tyr Cys Ser Gln Ser Tyr Asn Leu Tyr Thr Phe Gly Gln Gly Thr Lys
 115 120 125
 Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro
 130 135 140
 Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
 145 150 155 160
 Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
 165 170 175
 Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp
 180 185 190
 Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
 195 200 205

E1

Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln
 210 215 220

Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
 225 230 235

<210> 23
 <211> 2249
 <212> DNA
 <213> Mus sp.

<220>
 <221> CDS
 <222> (12) .. (417)

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<220>
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 <222> (1341) .. (1376)

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<220>
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 Met Gly Trp Asn Cys Ile Ile Phe Phe Leu Val Thr Thr
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gct aca ggt gtg cac tcc cag gtc cag ctg gtg cag tct ggg gct gag 98
 Ala Thr Gly Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu
 15 20 25

gtg aag aag cct ggg agc tca gtg aag gtg tcc tgc aaa gct tcc ggc 146
 Val Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly
 30 35 40 45

tac aca ttc act gat tat gct ata cag tgg gtg aga cag gct cct gga 194
 Tyr Thr Phe Thr Asp Tyr Ala Ile Gln Trp Val Arg Gln Ala Pro Gly
 50 55 60

cag ggc ctc gag tgg att gga gtt att aat att tac tat gat aat aca 242
 Gln Gly Leu Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr
 65 70 75

aac tac aac cag aag ttt aag ggc aag gcc aca atg act gta gac aag 290
 Asn Tyr Asn Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys
 80 85 90

tcg acg agc aca gcc tat atg gaa ctt agt tct ttg aga tct gag gat 338
 Ser Thr Ser Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp
 95 100 105

acg gcc gtt tat tac tgt gca aga gcg gcc tgg tat atg gac tac tgg 386
 Thr Ala Val Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp
 110 115 120 125

ggt caa ggt acc ctt gtc acc gtc tcc tca g gtgagtcctt aaaacctcta 437
 Gly Gln Gly Thr Leu Val Thr Val Ser Ser
 130 135

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 cctggaccct cgtggataga caagaaccga ggggcctctg cgccctgggc ccagctctgt 617
 cccacaccgc ggtcacatgg caccacctct cttgcag cc tcc acc aag ggc cca 671
 Ala Ser Thr Lys Gly Pro
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tcg gtc ttc ccc ctg gcg ccc tgc tcc agg agc acc tcc gag agc aca 719
 Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
 145 150 155

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 Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
 160 165 170

gtg tcg tgg aac tca ggc gct ctg acc agc ggc gtg cac acc ttc cca 815
 Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
 175 180 185

gct gtc cta cag tcc tca gga ctc tac tcc ctc agc agc gtg gtg acc 863
 Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
 190 195 200 205

gtg ccc tcc agc aac ttc ggc acc cag acc tac acc tgc aac gta gat 911
 Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
 210 215 220

cac aag ccc agc aac acc aag gtg gac aag aca gtt g gtgagaggcc 958
 His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val
 225 230

agctcagggg gggaggggtgt ctgctggaag ccaggctcag cctcctgcc tggacgcacc 1018
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actcccaatc ttctctctgc ag ag cgc aaa tgt tgt gtc gag tgc cca ccg 1369
 Glu Arg Lys Cys Cys Val Glu Cys Pro Pro
 235 240

tgc cca g gtaagccagc ccaggcctcg cctccagct caaggcggga caggtgccct 1426
 Cys Pro
 245

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Thr Asp Tyr Ala Ile Gln Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
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Glu Trp Ile Gly Val Ile Asn Ile Tyr Tyr Asp Asn Thr Asn Tyr Asn
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Gln Lys Phe Lys Gly Lys Ala Thr Met Thr Val Asp Lys Ser Thr Ser
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Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
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Tyr Tyr Cys Ala Arg Ala Ala Trp Tyr Met Asp Tyr Trp Gly Gln Gly
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Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu
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Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
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 Cys Pro Pro Cys Pro Ala Pro Pro Ala Ala Ala Pro Ser Val Phe Leu
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 Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
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